

PROCEEDINGS OF LEARNED SOCIETIES.

ROYAL SOCIETY.

January 11, 1872.—George Biddell Airy, C.B., President,
in the Chair.

“The Myology of the Cheiroptera.” By A. MACALISTER, A.B.,
M.B.T.C.D., Professor of Zoology, University of Dublin.

This paper is a record of the structural details of nineteen species of Bats; and for purposes of comparison the author has appended a description of the muscles of the Flying Squirrel (*Pteromys*) and of the Flying Lemur (*Galeopithecus*). The species of Bats examined were the following:—*Pteropus edulis*, *medius*, *Edwardsii*, *Macroglossus minimus*, *Cephalotes Pallasii*, *Cynonycteris amplexicaudalis*, *Eleutherura marginata*, *Rhinolophus ferrum-equinum*, *speoris*, and *diadema*, *Megaderma lyra*, *Arctibeus jamaicensis*, *Vampyrops vittatus*, *Vespertilio murinus*, *Vesperugo pipistrellus*, *Synotis barbastellus*, *Plecotus auritus*, *Noctulina altivolans*, and *Scotophilus hesperus*.

As the habits of the Bats are singularly different from those of the other mammals, the study of their myology becomes a matter of great interest. The special features displayed by their muscles are very numerous; but the principal of these may be tabulated as follows:—

- 1st. The singularly modified occipital trapezius.
- 2nd. The enormously developed and subdivided great pectoral.
- 3rd. The digastric being intersected by a linear inscription, forming a connecting link between the mammals with a single-bellied depressor of the mandible and those with a biventral muscle.
- 4th. The separate and displaced scapular deltoid.
- 5th. The palmaris longus acting as a superficial flexor.
- 6th. The displacements of the lower-extremity muscles consequent on the rotation of the lower limbs backward—such as the everted iliacus, the diminished glutei, and the weakness of the extensors of the knee.
- 7th. The increased size of the gracilis.
- 8th. The absence in general of the sartorius, tensor vaginæ femoris, biceps, plantaris, popliteus, and soleus.

It is interesting, in connexion with this last peculiarity, to notice the occurrence of a rudimental sartorius in one species and of a rudimental popliteus in another.

The cutaneous muscles are of very great interest; and this is increased by the comparison with those of the other flying mammals.

The author regards it as a point of very great importance that he has been able to apply the test of nerve-supply in the identification of some disputed muscles. Thus he has shown that the upper part at least of the occipito-pollicalis is of the nature of the trapezius, although its continuation is a cutaneous muscle; and this is interesting, as in the other flying mammals the entire of this

muscle is cutaneous and springs from the upper part of the platysma: he has also been able to show that the abdominal pectoral is not part of the pectoralis minor.

By dissecting a large number of species, the author has been able to correct a number of errors in the hitherto published records of the myology of the Cheiroptera—such as the origin of the fourth pectoral, the insertion of the latissimus dorsi, the arrangement of the forearm-muscles, &c.

Although the general plan of the muscular system is the same in all the species, yet there are very many suggestive varieties; and, from a comparison of their muscles, it would seem that each of the four great groups of Bats is characterized by a slightly different arrangement of muscles.

The author has, for purposes of brevity, carefully abstained from adding any thing of theoretical deduction to this paper, which he has endeavoured to confine to a simple statement of anatomical facts.

“Notice of further Researches on the Fossil Plants of the Coal-measures.” By Dr. W. C. WILLIAMSON, F.R.S. (in a Letter to Dr. SHARPEY, Sec. R.S.)

Owens College, Manchester, Nov. 16, 1871.

MY DEAR DR. SHARPEY,—Since I read my last communication to the Royal Society on the organization of the Fossil Plants of the Coal-measures I have done a large amount of work, having cut between two and three hundred new sections, and with most satisfactory results. I have obtained a series of specimens almost completing the life-history of one plant from Burutisland, beginning with the tips of the smallest twigs and ending with the large stems. The former are mere aggregations of parenchyma with a central bundle of barred vessels mixed with a small amount of primitive cell-tissue. As the twig grew the leaves assumed definite form, and the central vascular bundle opened out at its central part, so as to form a cylinder, the interior of which was occupied by parenchyma. This cylinder grew rapidly, the number of its vessels steadily increasing; but they were all equally arranged as in what I have termed the medullary vascular cylinder, i. e. *not* in radiating series. We thus obtain the origin of that remarkable cylinder, and see that it is the expanded homologue of the central vascular bundles of the living Lycopods. Whilst these processes were in progress the cortical portion became differentiated into layers, and the parenchymatous cells of the pith continued to multiply, so as to occupy the expanding interior of the vascular cylinder. After attaining a certain size through the above processes, a new element of growth appeared: an *exogenous* addition was made to the exterior of the cylinder, also consisting of barred vessels; but these are arranged in the radiating series described in my last memoir. This series continued to grow until it attained to considerable dimensions; but the entire vascular system always remains small, compared with the diameter of the

stem, the chief bulk of which consists of an enormously thick bark. The structure just described is that of a true example of the genus *Diploxyton* of Corda. But I have got abundance of specimens with leaves on the exterior of the bark, demonstrating that the plant is a true *Lomatophloios*, thus indicating the correctness of my supposition, advanced in my last memoir, that sooner or later the genus *Diploxyton* would have to be abandoned.

As if to place beyond doubt the accuracy of these interpretations, I have now got magnificent specimens, apparently representative of a *cambium layer*, in which the half-grown vessels and the imperfectly formed medullary rays are exquisitely clear. In addition to these discoveries I have obtained a *Lepidostrobus*, which I have no doubt is the fruit of the above plant. It is provided with both microspores and macrospores, the exteriors of the latter being curiously furnished with numerous caudate prolongations, causing them to resemble some of the fossil *Xanthidia* of the chalk.

I have further obtained, both from Lancashire and Burntisland, beautiful stems of another type, and which I have no doubt belong to *Asterophyllites*. These began to grow, as before, with a central vascular bundle surrounded by a cylinder of parenchyma; but the transverse section of the bundle soon became *triquetrous* instead of circular. This, it may be remembered, is the characteristic of the corresponding bundle of the strobilus which I have just described in the 'Transactions of the Literary and Philosophical Society of Manchester,' under the name of *Volkmannia Dawsoni*, and which I referred to *Asterophyllites*. This central triangular axis does not expand or become converted into a hollow cylinder; but vessels are at once added to each of its three sides, exogenously, and in radiating series, until it becomes converted into a cylindrical woody axis. I have specimens showing the nodes and internodes, leaving little, if any, room to doubt the close affinity between the plant in question and the verticillate-leaved *Asterophyllites*.

The details of these discoveries, along with those respecting a most remarkable series of Lycopodiaceous plants, to which I have given the name of *Dictyoxylon* (but this will have to be abandoned for the late Mr. Gourlie's name of *Lyginodendron*), will be laid before the Royal Society with as little delay as possible. I may observe that the plants last referred to have developed, so far as type is concerned, in a way very similar to that of the *Lomatophloios*, allowance being made for generic and specific peculiarities.

I am, my dear Sir,

Very sincerely yours,

W. C. WILLIAMSON.

I ought not to close this letter without acknowledging the indefatigable energy of G. Grieve, Esq., of Burntisland, who has supplied me with a constant stream of specimens, upon which I have been able to operate, thus rendering an admirable service to the cause of palæophytology.